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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/635,621	08/06/2003	Hsi-Kuei Cheng	TSM02-0971	8481

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SLATER & MATSIL, L.L.P.
17950 PRESTON ROAD, SUITE 1000
DALLAS, TX 75252

EXAMINER

NGUYEN, HA T

ART UNIT PAPER NUMBER

2812

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/635,621

Applicant(s)

CHENG ET AL

Examiner

Ha T. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-9 and 22-33 is/are allowed.
- 6) ☒ Claim(s) 11-13,34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1-31-5.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION***Notice to applicant***

1. Applicant Response to the Office Action mailed 2-24-5 has been entered and made of record.

Claim Rejections - 35 USC § 103

2. Claims 12-13 and 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Michael et al. (USPN 6174824, hereinafter "Michael") in view of Barrow (USPN 5880529).

Referring to Figs. 1-5 and related text, Michael discloses [Re claim 34] a method of forming post passivation interconnects for an integrated circuits the method comprising: forming a passivation layer 130 over a substantially complete integrated circuit and over a first plurality of contact pads 120, the first plurality of contact pads being in a first connection pattern, wherein the passivation layer is formed from a non-oxide material; forming an oxide buffer layer 200 over and abutting the passivation layer, the oxide buffer layer having a thickness substantially smaller than a thickness of the passivation layer. But it does not disclose expressly forming a metal layer over the oxide buffer layer; and patterning the metal layer to form a second connection pattern comprising a second plurality of contact pads; wherein the second connection pattern differ from the first connection pattern; wherein at least some of the second plurality of contact pads are electrically connected to at least some of the first plurality of contact pads. However, the missing limitations are well known in the art because Barrow discloses the formation of metal layers over dielectric layers and formation of inner and outer bond pads (See Fig. 4, #20, 22). Besides, the examiner takes Official Notice that it is well known in the art that bond pads are formed by patterning a metal layer. A person of ordinary skill is motivated to modify Michael with Barrow to obtain a plurality of bond pads with minimized spacing pitch (see Barrow, abstract).

[Re claims 12-13] Michael fails to disclose wherein forming an oxide buffer layer comprises forming an oxide buffer layer with a thickness of less than 25 nanometers; wherein thickness of the nitride passivation layer is at least about 20 times greater than the thickness of the oxide buffer layer. However any variation in thickness in the present claims is obvious in light of the cited art, because the changes in thickness produce no unexpected function. The routine varying of parameters to produce expected changes are within the ability of one of

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ordinary skill in the art. Patentability over the prior art will only occur if the parameter variation produces an unexpected result. In re Aller, Lacey and Hall, 105 U.S.P.Q. 233, 235. In re Reese 129 U.S.P.Q. 402, 406.

Therefore, it would have been obvious to combine Michael with Barrow to obtain the invention as specified in claims 12-13 and 34.

3. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Michael in view of Barrow, as applied above, and further in view of Fan (USPN 6022809).

The combined teaching of Michael and Barrow discloses substantially the limitations of claim 11, as shown above.

But it fails to disclose expressly the oxide buffer layer is etched in a chamber having an inner wall comprising primarily quartz.

However, the missing limitation is well known in the art because Fan discloses that a vacuum chamber having inner walls of primarily quartz is used to etch material (See par. bridging cols. 5 and 6).

A person of ordinary skill is motivated to modify Michael and Barrow with Fan to obtain device containing less contaminants ensuring better quality.

Therefore, it would have been obvious to combine Michael and Barrow with Fan to obtain the invention as specified in claim 11.

Response to Amendment

4. In view of Applicants' arguments, the rejections of claims 1-9 and 11-33, as stated in the Office Action mailed 2-24-5 have been withdrawn.

Applicants' arguments concerning the rejections have been rendered moot in view of the new ground of rejection.

Allowable Subject Matter

5. Claims 1-9 are 22-33 are allowed.

Claims 1, 22, and 29 recite "buffer layer comprising a silicon oxide layer; removing a top portion of the buffer layer; forming a second connection layer in the post passivation metal layer such that portions of the second connection pattern are electrically coupled to the first plurality

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of contact pads, wherein the second connection pattern differs from the first connection patterns”; “the first plurality of contact pads could otherwise be used to provide electrical connection to an external component in packaging an integrated circuit chip comprising the semiconductor device by forming wire bonding or solder balls on the first plurality of contact pads”; “forming an oxide buffer layer over and physically contacting the silicon nitride passivation layer, the oxide layer buffer layer having a thickness substantially smaller than a thickness of the passivation layer”.

These features in combination with the other elements of the claims are neither disclosed nor suggested by the prior art of record.

Claims 2-9 are 23-28, and 30-33 variously depend from claims 1, 22, or 29, they are allowed for the same reason.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ha T. Nguyen whose telephone number is (571) 272-1678. The examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM, except the first Friday of each bi-week. The telephone number for Wednesday is (703) 560-0528.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt, can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ha Tran Nguyen
Primary Examiner
6- 24 - 05